IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of   :

Mark Edwin CADMAN   :

Serial No.: [NEW]   :   Mail Stop Patent Application

Filed: 22 March 2005   :   Attorney Docket No. RICE.0001

For: A METHOD OF DELIVERING A TEST TO A CANDIDATE

CLAIM OF PRIORITY

U.S. Patent and Trademark Office
Randolph Building
Customer Service Window
401 Dulany Street
Alexandria, Virginia 22314

Sir:

   Applicant, in the above-identified application, hereby claims the benefit of priority under

35 U.S.C. 119 & 365 from the following patent applications:

   Australian Patent Appln. No. 2002-951608   filed: 23 September 2002

   PCT Patent Appln. No. PCT/AU2003/001254   filed: 23 September 2003

as acknowledged in the Declaration of the subject application.

          Respectfully submitted,

          VOLENTINE FRANCOS & WHITT, PLLC

          Kenneth D. Springer
          Registration No. 39,843

One Freedom Square
11951 Freedom Drive, Suite 1260
Reston, VA 20190
Tel. (571) 283-0720
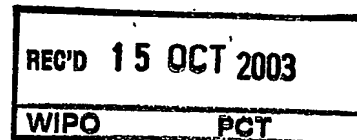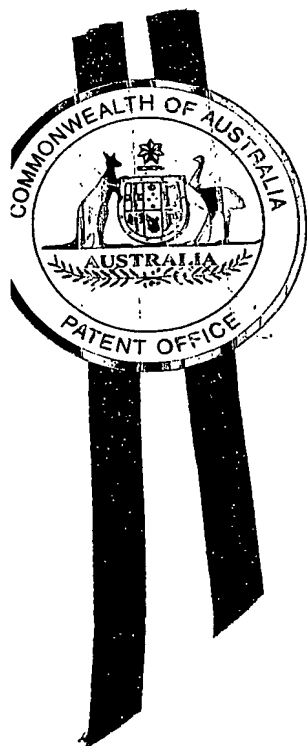Fax (571) 283-0740

Date: 22 March 2005

Patent Office
Canberra

REC'D 15 OCT 2003

WIPO   PCT

I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND
SALES hereby certify that annexed is a true copy of the Provisional specification
in connection with Application No. 2002951608 for a patent by LEWIS
CADMAN CONSULTING PTY LTD as filed on 23 September 2002.

WITNESS my hand this
Eighth day of October 2003

JONNE YABSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

PRIORITY
DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"A METHOD OF DELIVERING A TEST TO A CANDIDATE"

The invention is described in the following statement:-

BACKGROUND TO THE INVENTION

The invention relates to a method of delivering a test and in particular to a method of delivering a test to a candidate.

The invention has been developed primarily for testing the relative cognitive
5   development of children and will be described hereinafter with reference to that application. It will be appreciated, however, that the invention is not limited to that particular field of use and is also applicable to testing the cognitive abilities of adults, including those who have experienced a loss of cognitive ability due to a physical accident or a mental illness. The invention is also applicable to assessing the progress of a
10 individual with learning difficulties and/or the effectiveness of a learning program in which such an individual is participating.

DISCUSSION OF THE PRIOR ART

It has been known to test the cognitive abilities of individuals to gain an indication of the suitability of that individual for a given role in a workplace. This has been applied
15 to recruitment programs for businesses and other organisations. It has also been known to apply confidence indicators to these tests to further refine the data provided.

However, the known testing is difficult to accurately apply to children and those with learning difficulties. That is, the testing format is unsuitable for individuals of immature cognitive functioning as those individuals are presented with items that are
20 beyond their memory operating potential. Moreover, the format has no regard for any progressive changes in ability to deal with cognitive complexity that are associated with maturation and with old age. As such, the current version of the test does not afford a ready way to track cognitive development/degeneration.

Any discussion of the prior art throughout the specification should in no way be

25

considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

DISCLOSURE OF THE INVENTION

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

According to a first aspect of the invention there is provided a method of delivering a test to a candidate, the test having a plurality of questions that are chosen from a plurality of question types ranging from an easiest question type to a hardest question type, the method including the sequential steps of:

delivering to the candidate a question selected from the easiest question type and, thereafter, delivering to the candidate one or more questions from the same question type; and

delivering to the candidate a question selected from another of the question types and, thereafter, delivering to the candidate one or more questions from the same question type.

Preferably, the test includes question types 1, 2, ..., n, where type 1 is the easiest question type and type n is the hardest question type and the method includes sequentially delivering to the candidate the questions of question type 1, question type 2, ... and question type n. More preferably, all the questions of a given question type are sequentially delivered to the candidate. Even more preferably, the candidate is delivered a question only when a preceding question in the sequence has been answered.

Preferably also, upon answering a question, the candidate is asked to indicate his or her confidence that the answer to the question was correct. More preferably, the candidate

is asked to indicate his or her confidence that the answer to the question was within one of

two or more confidence bands. More preferably, there are five confidence bands.

In a preferred form, the test is delivered by a testing device that includes a display

for visually displaying a question to the candidate and an input device for allowing the

5   candidate to answer the question. More preferably, the testing device includes a processor

for driving the display and for being responsive to the input device for determining the

answer provided by the candidate. Even more preferably, the input device includes a

keyboard. In other embodiments the input device includes a pointer device such as a

mouse, a track ball or a touch pad. In some embodiments, the input device includes a

10   combination of the keyboard and the pointer device.

Preferably, the test is contained as question data on a storage medium and the

processor selectively accesses the question data to deliver the questions sequentially.

More preferably, the storage medium also includes sequence data representative of the

sequence in which the question data is accessed by the processor. Even more preferably,

15   the storage medium is controlled by a server that is remote from the processor and which

is responsive to predetermined input from the processor for allowing the test to be

delivered to the candidate.

In a preferred form, the test is delivered in HTML, while in other embodiments it is

delivered as XML. However, in alternative embodiments, the storage medium is a

20   compact disc or other portable storage media that is physically provided to the candidate

for interaction with the processor. In other embodiments, the question data and sequence

data are provided electronically as an executable file to the processor and/or the candidate.

Preferably, the questions are "Swaps" questions, which include:

a plurality of images that are to be displayed to the candidate in a predetermined

spatial relationship; and

an instruction sequence associated with those representations for indicating to the

candidate the required mental reorganisation of the representations.

5   Preferably also, the questions include three images. More preferably, the images

are clearly visually distinct.

In a preferred form, the "Swaps" questions are selected from the above question

types, which include:

1. The easiest question type or Level 1 – the candidate is instructed to memorise the   .

10   relative spatial order of the three images and, once the candidate indicates he or she

is ready, the test progresses to the next step and requests the candidate to indicate

that order from memory. In this Level 1 case there are no swaps per se..

2. Question type 2 or Level 2 – the candidate is provided with three images having a

predetermined relative spatial order and is instructed to complete a single swap of

15   images. When the candidate indicates that he or she is ready, the test progresses to the

next step and requests the candidate to indicate the revised order from memory. For

example, the candidate is, in some cases, asked to swap the second and the third image.

3. Question type 3 or Level 3 – this is similar to the previous question type, with the

exception that the candidate is requested to complete two swaps of the images that

20   have been provided. For example, the instructions in one embodiment are to swap

image 2 and image 3, then swap image 1 and image 3. Once the candidate indicates

that they are ready, the test progresses to the next step and requests the candidate to

indicate the revised order from memory.

4. Question type 4 or Level 4 – as with the prior type except that the candidate completes three swaps. In one embodiment the instructions include, for example, to swap image 2 and image 3, then swap image 1 and image 3, and then swap image 1 and image 2.

5. The hardest question type or Level 5 – the candidate is instructed to complete four swaps. For example, in one embodiment, the instructions direct that the candidate swap image 2 and image 3, then swap image 1 and image 3, then swap image 1 and image 2, and then swap image 1 and image 3.

Preferably, the candidate is provided with a plurality of alternatives from which the answer is selected. However, in other embodiments the candidate clicks and drags the images to the locations that are believed to be correct. Questions of this kind are described in more detail in the earlier filed International Patent Application PCT/AU99/00816, the disclosure of which is incorporated herein by way of cross reference.

Preferably also, the time taken for the candidate to read and answer a question is recorded. More preferably, the time taken by the candidate to select a confidence band is also recorded.

According to a second aspect of the invention there is provided an apparatus for delivering a test to a candidate, the test having a plurality of questions that are chosen from a plurality of question types ranging from an easiest question type to a hardest question type, the apparatus including:

a display for sequentially displaying to the candidate one or more question selected from the easiest question type; and

input means for allowing the candidate to answer the questions and for triggering the display to display to the candidate the next question in the sequence or, if at the end of the sequence, one or more questions from the next hardest question type.

According to a third aspect of the invention there is provided a method of assessing the relative cognitive ability of a candidate, the assessment having a plurality of questions that are chosen from a plurality of question types ranging progressively from an easiest question type to a hardest question type, the method including the sequential steps of:

5   delivering to the candidate a question selected from the easiest question type;

allowing the candidate to answer the question and, thereafter, delivering to the candidate sequentially one or more questions from the same question type;

determining a quantifier in response to the answers provided by the candidate to the questions of the easiest question type;

10   being responsive to the quantifier being above a predetermined threshold for delivering to the candidate a question selected from another of the question types and, thereafter, delivering to the candidate one or more questions from the same question type; and

being responsive to the quantifier and the question types for which answers have

15   been provided for deriving an assessment of the relative cognitive ability of a candidate.

Preferably, the said another of the question types is the next in the range of question types. More preferably, the method also includes determining a second quantifier in response to the answers provided by the candidate to the question of the said another question types. Even more preferably, the method includes being responsive to the second

20   quantifier being above a predetermined second threshold for delivering to the candidate a question selected from the next question type in the progression of question types and, thereafter, delivering to the candidate one or more questions from that question type. That is, the candidate is not presented with a question from a particular question type unless he or she has answered correctly sufficient of the questions in the preceding question types. In

some embodiments, the quantifier is determined from the answers of selected ones of the questions of the question type.

According to a fourth aspect of the invention there is provided an apparatus for assessing the relative cognitive ability of a candidate, the assessment having a plurality

5   of questions that are chosen from a plurality of question types ranging progressively from an easiest question type to a hardest question type, the apparatus including:

a processor for driving a display to deliver to the candidate a question selected from the easiest question type;

an input device for allowing the candidate to answer the question, wherein the

10   processor is responsive to the answer being provided to subsequently deliver to the candidate sequentially one or more questions from the same question type;

a calculation module being responsive to the answers provided by the candidate to the questions of the easiest question type for determining a quantifier, wherein the processor is responsive to the quantifier being above a predetermined threshold for driving

15   the display to deliver to the candidate a question selected from another of the question types and, thereafter, delivering to the candidate one or more questions from the same question type; and

an assessment module for being responsive to the quantifier and the question types for which answers have been provided for deriving an assessment of the relative

20   cognitive ability of a candidate.

According to a fifth aspect of the invention there is provided a method of assessing the progress of a candidate in response to a learning program, the assessment having a plurality of questions that are chosen from a plurality of question types ranging

progressively from an easiest question type to a hardest question type, the method

including the sequential steps of:

      delivering to the candidate a question selected from the easiest question type;

      allowing the candidate to answer the question and, thereafter, delivering to the

5   candidate sequentially one or more questions from the same question type in response to

the preceding question being answered;

      determining a quantifier in response to the answers provided by the candidate to

the questions of the easiest question type;

      being responsive to the quantifier being above a predetermined threshold for

10   delivering to the candidate a question selected from another of the question types and,

thereafter, delivering to the candidate one or more questions from the same question type;

and

      being responsive to the quantifier and the question types for which answers have

been provided for assessing the progress of a candidate in response to the learning

15   program.

BRIEF DESCRIPTION OF THE DRAWINGS

      Preferred embodiments of the invention will now be described, by way of example

only, with reference to the accompanying drawings in which:

      Figure 1 is a schematic view of an apparatus for delivering a test in accordance

20   with the invention; and

      Figure 2 is a flow chart of a preferred method of using the apparatus of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

      Referring to the drawings there is illustrated a desktop computer 1 having a desktop

unit 2 in which is housed one or more processors, RAM, ROM, hard drives, a network

card, other cards and devices and the controlling software. None of these hardware of software components are specifically illustrated and it will be understood by those skilled in the art that many options and combinations of these components are available.

Computer 1 also includes a video display unit (VDU) 3 that interfaces with unit 2

5   to display to a candidate selected still and/or video images. An input device, in the form of a keyboard 4 and a mouse 5 allow the candidate to enter data and/or to answer the questions that are presented to them, as will be described in more detail below.

Desktop unit 2 is connected to a network, which in this case is a LAN 6, via a network card (not shown) and cabling 7. The LAN makes use of one of a variety of

10   network protocols and is delivered via a network server (not shown). In some embodiments, the functions of the network server are shared amongst a plurality of interconnected servers.

A test delivery server 8 is connected to LAN 6 and has access to a storage medium in the form of a hard drive 9. This hard drive includes a database of questions

15   that are graded into a plurality of question types ranging from an easiest question type to a hardest question type. The database also includes data indicative of the sequence in which the questions are to be asked and other data for allowing a determination as to whether or not the sequence is to be progressed. This is set out below in more detail.

Initially, the candidate turns computer 1 on and logs into LAN 6 utilising the

20   designated user name and password or passwords. In this case, the candidate is due for an assessment and is provided a prompt by the network that this is so. Preferably, the prompt is in the form of an email including a hypertext link that the candidate is able to click using mouse 5 so that the first page of the test is delivered. However, in other embodiments, the LAN recognises the user and that an assessment is due and immediately initiates the test.

In this embodiment, the test is delivered in HTML pages that are obtained from hard drive 9 and sequentially delivered to desktop unit 2 via server 8 and LAN 7 and displayed on display 3 to the candidate. In other embodiments, different languages or formats are utilised. In some embodiments the delivery language is XML, although other

5 alternatives are also available.

In other embodiments, use is made of other programming languages. For example, in an "internet" delivered embodiment, the programming is written in the Java language, and the tests as discrete packages or Java Servlets that are transferred to the end-users' computers (the respective candidates' computers) to allow "real time" measurement of

10 reaction time/speed of responding.

Once the candidate has selected the relevant hypertext link in the email referred to above, the test is commenced and follows the steps set out in graphical form in Figure 2. The candidate is initially presented with a HTML page that requests confirmation of his or her personal details and the nature of the assessment being conducted. Once this

15 confirmation has been provided, the candidate is delivered a subsequent page that includes an introduction to the test and some instructions as to how the question should be answered. Preferably also, the candidate is provided with the choice of completing one or more sample questions so as to become more familiar with the question format.

Before progressing further through the process of Figure 2, it is beneficial to look

20 more closely at the format of the test. In this embodiment, the test includes a plurality of questions that are selected from the questions stored on the database. These questions are all categorised with a question type and are designated as question type 1, question type 2, ..., question type n. Where type 1 is the easiest question type and type n is the hardest question type and the intervening types are graded progressively between the two extremes.

That is, as the question type increases, so to does the difficulty of the questions contained within that type.

In the field of cognitive testing, such as that with which the preferred embodiments is concerned, it is known to ask questions that are referred to as "Swaps" questions. This form of question is one of the forms of questions set out in International application no. PCT/AU99/00816 which was filed in the name of the present applicant. The disclosure contained within that application is incorporated herein by way of cross reference.

As used in this embodiment, the Swaps questions include a plurality of images, usually three, that are displayed to the candidate in a predetermined spatial relationship. Included under the images is an instruction sequence indicating to the candidate the required spatial reorganisation of those images. This reorganisation is to be performed mentally by the candidate who, once satisfied with the information at hand, has the question removed and is asked to choose, as an answer to the question, one of a plurality of spatial combinations of the images that are presented as being possible answers. The time taken to cognise the question and chose the answer is timed. Moreover, after completing the question, the candidate is asked to quantify his or her confidence that the answer was correct. This quantification is within one of five bands, those being 0% to 20%, 21% to 40%, 41% to 60%, 61% to 80% and 81% to 100%. In other embodiments a different number of bands are used. In still further embodiments, the candidate is asked to nominate a percentage confidence. As discussed in the abovementioned PCT patent application, there are embodiments where a confidence indication is sought from the candidate after each question is asked, while in other embodiments, that indication is only sought for less than all the questions.

In this embodiment, the images used in the Swaps questions are clearly visually distinct. Examples of three images are a house, a car and a bird. Another example is a hammer, a dog and a balloon. As will be appreciated from the teaching herein, many other combinations are possible.

5   In one embodiment, the starting combination of the images is always the same. So, for the examples of the images being that of a house, a car and a bird, the candidate is always provided with the same spatial arrangement of those images with each question. In other embodiments, however, the starting combination is varied throughout the test. That is, even within each question type, the questions will include different

10   combinations of images that are presented to the candidate with the written instructions.

In this embodiment, the starting combination is varied through the test both in the actual images used and the spatial arrangement of those images. While these factors are predetermined for each question, so as to provide equivalence for difference candidates, in other embodiments the determination is random so that different candidates will be

15   presented with different combinations of images.

The test of the preferred embodiment has five question types, which include:

1. The easiest question type or Level 1 – the candidate is instructed to memorise the relative spatial order of the three images and, once the candidate indicates he or she is ready, the test progresses to the next step and requests the candidate to indicate

20   that order from memory. In this Level 1 case there are no swaps per se.

2. Question type 2 or Level 2 – the candidate is provided with three images having a predetermined relative spatial order and is instructed to complete a single swap of images. When the candidate indicates that he or she is ready, the test progresses to the next step and requests the candidate to indicate the revised order from memory. For

example, the candidate is, in some cases, asked to swap the second and the third image.

The convention being, that the images are arranged in a linear horizontal array and,

progressing from left to right, the images are referred to as the first, the second and the

third images respectively. Alternatively, they are referred to as image 1, image 2 and

5   image 3. In some embodiments, the images are accompanied by a corresponding

reference numeral to assist the candidate in understanding this referencing convention.

3. Question type 3 or Level 3 – this is similar to the previous question type, with the

exception that the candidate is requested to complete two swaps of the images that

have been provided. For example, the instructions in one embodiment are to swap

10   image 2 and image 3, then swap image 1 and image 3. Once the candidate indicates

that they are ready, the test progresses to the next step and requests the candidate to

indicate the revised order from memory.

4. Question type 4 or Level 4 – as with the prior type except that the candidate

completes three swaps. In one embodiment the instructions include, for example, to

15   swap image 2 and image 3, then swap image 1 and image 3, and then swap image 1

and image 2.

5. The hardest question type or Level 5 – the candidate is instructed to complete four

swaps. For example, in one embodiment, the instructions direct that the candidate

swap image 2 and image 3, then swap image 1 and image 3, then swap image 1 and

20   image 2, and then swap image 1 and image 3.

Once the candidate has reviewed the images and the associated instructions

concerning the swaps that are to be cognised, he or she uses mouse 5 to activate a hypertext

link that delivers to the candidate a plurality of alternatives from which the answer is to be

selected. That is, the questions are in the form of multiple-choice questions. Importantly,

the candidate is not now able to access both the question and the initial spatial arrangement of images upon which the question is based. This requires the candidate to retain information, in the short term, of the spatial order of the "swapped" images. In the case of web delivered test, this is achieved by disabling the history function and "Back" button of

5   the web browser. In other embodiments alternative means are relied upon.

In other embodiments, once the candidate indicates that he or she has read the required instructions, the next page is delivered, but this does not present the candidate with a choice of answer. Rather, the candidate is presented with the images in the original relationship and required to use the mouse to sequentially designate which of the images is

10   in the left most, the middle and the right most positions. For non-web-based delivery making use of this mode of answer, the user is required to "click and drag" the images – which are present in the initial spatial relationship – to the locations that are believed to accord with that directed by the instructions.

The time taken for the candidate to read and answer a question is recorded. More

15   preferably, the time taken by the candidate to select a confidence band is also recorded. The first is used to provide an indication of the level of candidate's confidence that he or she correctly answered the questions concerned, while the second provides an indication of the general confidence of the candidate.

Referring to Figure 2, once the user has entered his or her details, server 8 is

20   provided with that information and configures the test to be delivered, in the event that that is required for that candidate. For example, in some embodiments the candidate is attempted one in a series of tests to provide an ongoing assessment of both the candidate's cognitive abilities and any progress or improvement that is being made in response to a learning program that the candidate is being subjected to. In this case, server 8 is

responsive to the identity information provided by the candidate to prepare to deliver the

desired test in the series of test being undertaken. That is, the test regime is not only

responsive to the candidate, but also the results of earlier tests taken by the candidate and

the results of those tests.

5   Once server 8 has configured the test and the proposed questions to be presented to

the candidate, those questions are arranged in groups of question types such as the Level 1,

Level 2, Level 3, Level 4 and Level 5 question types referred to above. Each of these

question types includes usually five or more questions of that type. That is, a typical test

includes twenty five questions in total. However, in other embodiments it more or less

10   questions of each question type are used. Moreover, in further embodiments, there are not

necessarily the same number of questions in each question type..

While the accuracy of the test will be theoretically improved with the greater number

of questions asked, there is a practical trade off due to the attention span and concentration

levels that are able to be provided by the candidate.. For young children and candidates

15   with learning disabilities, relatively few questions are used, while for adults it is possible to

gain more accuracy through the use of a greater number of questions.

Server 8 also designates each question in a given question type with a reference that

determines the order that the question will be presented to the candidate. For example, in

this embodiment, the Level 1 question type includes four Swaps questions, which are

20   reference as 1, 2, 3 and 4 respectively. This reference corresponds to the variable "x" in

Figure 2, while the question type corresponds to the variable "n".

Initially, both x and n are set to 1, and are incremented by 1 in accordance with the

flow chart of Figure 2. As will be apparent to a skilled addressee, from the teaching herein,

x and n are integers, where $1 \leq x \leq x_{(max)}$ and $1 \leq n \leq n_{(max)}$. In this embodiment, $x_{(max)} = 4$

for the question type referred to as Level 1, while $n_{(max)} = 5$, in that there are five question types. In other embodiments both $x_{(max)}$ and $n_{(max)}$ have other values.

Server 8 presents the candidate with question 1 of the Level 1 question type. Once the candidate is satisfied with the question, use is made of the mouse to indicate that this is

5 the case. For example, for the web-delivered test of the present embodiment, the candidate provided that indication by manoeuvring mouse 5 so that the cursor displayed on VDU 3 overlies a clearly labelled "Proceed" button on the web page. One of the buttons on mouse 5 is depressed by the candidate to click the "Proceed" button. Server 8 delivers a subsequent web page providing the choices from which the candidate must select the

10 answer to the question. Again, use is made of mouse 5 to click on the selected choice. Server 8 is responsive to the click to not only gather the relevant information as to the answer provided and the time taken by the candidate, but also to deliver a subsequent page requesting a confidence indicator from the candidate. In this embodiment, there are five confidence bands that are graphically represented on VDU 3. The candidate selects one of

15 the bands through use of mouse 5.

With the first question being answered and a confidence indicator obtained, server 8 increments x by 1 and determines whether the new value for x exceeds $x_{(max)}$. If not, the test progresses to ask the next question in that same question type. This loop – referred to as the first loop – is continued until $x = x_{(max)}$. That is, all the questions of the easiest

20 question type are presented, and answers obtained, prior to any other questions of a different – and in this case more challenging – question type are presented.

The test also includes a "time out" provision, in that if the candidate does not answer the question within a predetermined period, the test will signal that the time available to

answer the question has lapsed. Server 8 is made aware of the time out, increments x by 1, and then proceeds with the steps that would have otherwise been followed.

If, once incremented, $x > x_{(max)}$ then there are no further questions of that question type to be presented to the candidate for this particular assessment. That being the case, the

5 test branches from the first loop into a second loop. This second loop includes the first step of determining whether $n = n_{(max)}$. If yes, then the test is complete and the candidate is informed accordingly. If no, server 8 determines a quantifier for the question type. This quantifier is referred to as Q_n. For this embodiment there will be a maximum of four quantifiers calculated, Q_1, Q_2, Q_3, and Q_4. A quantifier is not required for the Level 5

10 question type, as will be explained below. However, in some embodiments Q_5 is calculated for use in subsequent assessments undertaken by the candidate.

In this embodiment the quantifier is calculated by server 8 based upon a weighted sum of: the correctness of the answers provided by the candidate; the time taken to provide those answers; and the relationship between the correctness of the answers and the

15 confidence indicators. In other embodiments, the quantifier is calculated in response to less factors or, in further embodiment, other factors. If the quantifier does not exceed the threshold, the test ends.

If the quantifier, once calculated for a given question type, exceeds a predetermined threshold for that question type, n is incremented by 1 and x is set to 0. That is, server 8

20 progresses to the next question type, as all the question of the preceding type have already been presented. The process then returns to the first loop until all the questions of the new question type are presented and answered. When this has occurred, the process returns to the second loop. When all the questions to be presented have been presented, the test ends by branching to the "End Test" box.

As referred to above, the question types are presented in order of difficulty. Accordingly, a candidate is only required to answer the more difficult questions only once he or she has demonstrated that the easier questions are able to be sufficiently cognised and correctly answered. Moreover, the threshold for the quantifiers changes, in this

5   embodiment, for the different question types and the candidate. That is, for the higher level question types, the quantifier is lower, as more time is allowed for the candidate to answer these questions.

In other embodiments it is known to use more or less than five levels of questions. In practice, however, it has been found that five levels is a good balance, particularly for

10   younger candidates.

All embodiments, regardless of the number of question levels, present those questions in a systematic and structured order, progressing from the easiest type to the hardest type. This allows the candidate to only have to answer as many questions as are relevant, and not have to be unnecessarily preoccupied with answering questions that are

15   simply beyond their cognitive ability at that time. The nature of the test also allows it to be regularly reused, particularly in cases where a candidate does not progress through all the available levels of questions.

In the embodiment described above, the test automatically advances and concludes in accordance with the answers provided by the candidate. In other embodiments, however,

20   the administrator of the test has the ability to intervene and progress the test or conclude the test, notwithstanding that this would not have occurred otherwise. That is, the administrator is provided with real time access to the test results so that *in situ* control by the administrator is allowed.

The preferred embodiment of the invention includes the following advantages:

1. It is applicable to a wide range of age groups as the complexity of the test changes between levels. That is, test takers range from very young children to senior age adults.

2. It is used to determine a level of cognitive functioning (by determining the complexity the test taker effectively deals with) in comparison to test takers of their own broad age group. As such, delays in functioning, or functioning over and above expected levels, are more readily mapped through a single test.

3. Improvements/deterioration in cognitive functioning are readily determined over time.

   Applications of the preferred embodiments include:

1. Recruitment testing: that is, allowing an assessment of a candidate's suitability for a role within an organisation.

2. Assessing the cognitive development of children;

3. Assessing the progress of an injured adult in a cognitive rehabilitation program.

4. Assessing the cognitive effects of a pharmaceutical on a candidate.

5. Assessing the cognitive effects of aging and disease.

   The embodiment described in detail above utilises an input device in the form of a desk top computer having a VDU, a mouse and a keyboard, amongst other things. In some embodiments, however, use is made of a touch screen. In other embodiments, use is made of voice recognition software and the associated microphones to allow the users to input their respective responses to the questions.

Although the invention has been described with reference to specific examples, it

will be appreciated by those skilled in the art that it may be embodied in many other forms.

DATED this 23rd Day of September, 2002

5   LEWIS CADMAN CONSULTING PTY LTD

Attorney: PHILLIP D. PLUCK
Fellow Institute of Patent and Trade Mark Attorneys of Australia
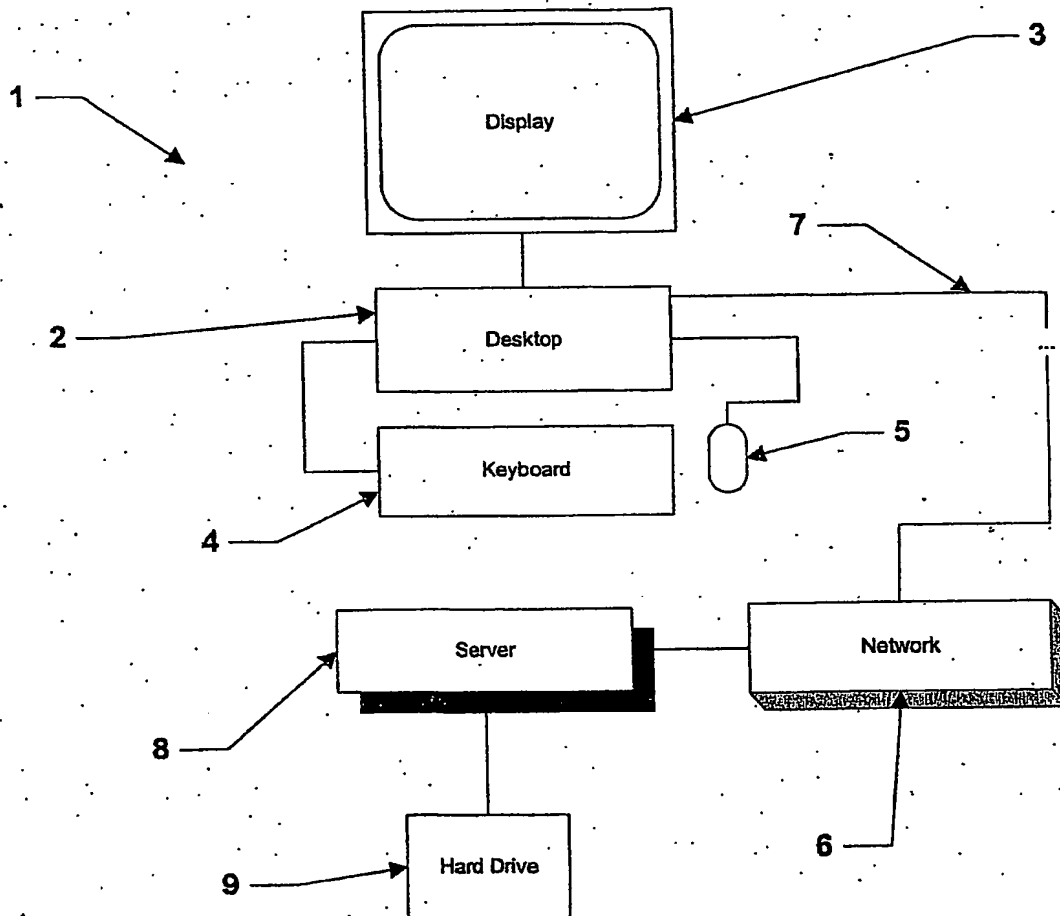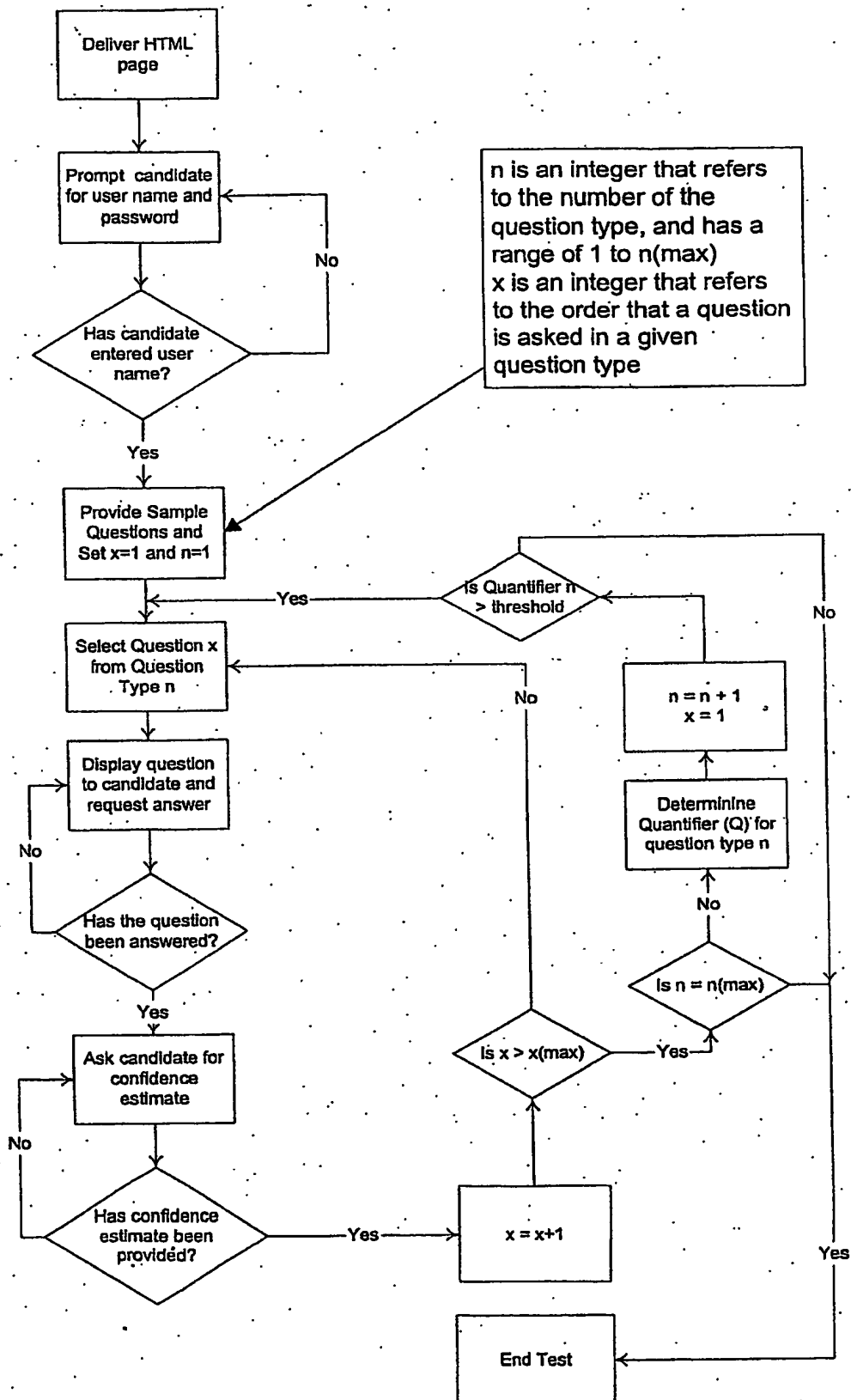of BALDWIN SHELSTON WATERS

Figure 1

Figure 2

Deliver HTML page

Prompt candidate for user name and password

Has candidate entered user name? — No

n is an integer that refers to the number of the question type, and has a range of 1 to n(max)
x is an integer that refers to the order that a question is asked in a given question type

Yes

Provide Sample Questions and Set x=1 and n=1

Is Quantifier n > threshold — Yes

Select Question x from Question Type n

No

n = n + 1
x = 1

Display question to candidate and request answer

No

Determinine Quantifier (Q) for question type n

No

Has the question been answered?

Is x > x(max)

Is n = n(max)

Yes

No

Yes

Ask candidate for confidence estimate

No

Has confidence estimate been provided?

Yes

x = x+1

Yes

End Test